

Australian Palms: natives only?

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Australian Palms: Biogeography, Ecology and Systematics

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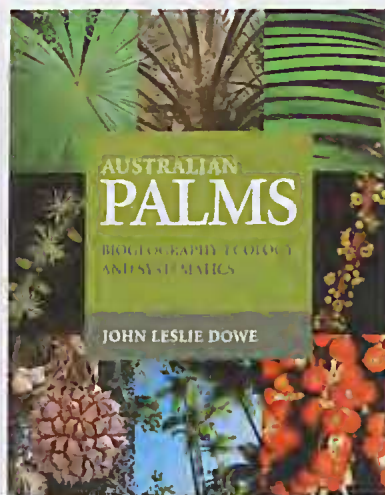
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This book presents the culmination of more than twenty years research by the author. It provides a comprehensive systematic and taxonomic treatment of Australia's palm flora, which consists of 60 species in 21 genera, including six species on Lord Howe Island, Christmas Island and Norfolk Island. This is the first continental treatment for more than a century and provides a long overdue reference to this interesting group. It promises to be the essential reference guide to Australia's palms for many years to come.

The book is divided into twelve chapters. Chapter 1 provides a short overview of the higher level taxonomic representation and geographic distribution of Australia's palms. This chapter concludes with a paragraph devoted to "economic botany", and another paragraph serves to introduce the conservation ratings that are given for every species. Economic use of palms is given solely in terms of ornamental horticulture of Australian indigenous species. It is surprising that no mention is made of the extensive aboriginal usage of palms for roof thatch, baskets, fibre, fishing line and food. It seems that the focus of this book is essentially on Australian indigenous species since the time of white settlement of Australia (apart from an account of fossils and biogeography). This focus also leads to no mention of the introduced species being currently grown in Australia, e.g. *Phoenix dactylifera* (date palm),



and *Elaeis guineensis* (oil palm) for food and potentially biofuel. Indeed this xenophobia is carried through into chapter 2, "Early documentation of Australian palms", which purely focuses on European explorers and botanists' accounts of Australian indigenous palms. The historical account is very interesting and provides a good context for the development of our understanding of Australia's palm flora, but surely some account of what is known of aboriginal knowledge would have been appropriate? Likewise there is no mention of the first records of introduced species in Australia, which would have provided useful information for assessing their subsequent spread.

Historical biogeography is the focus of the third chapter, which contains a descriptive review of fossil records from Australia and, interestingly, New Zealand. Inclusion of New Zealand is warranted in terms of its close floristic development, but it does make the exclusion of extra-Australian taxa from the majority of the book more puzzling. Later in the chapter co-occurrence of species in Australia and New Guinea is explained via review of descriptive scenarios. This style is continued in the following chapter, "Distribution and ecology", which covers a broad range of topics such as distribution, fire, climate, edaphic preferences, cyclones, altitude, demography and population genetics. These sections are well referenced and provide a very useful insight into these aspects of palm biology, which would otherwise be dispersed in literature inaccessible to the average reader.

A systematic account of Australian indigenous palms commences in the fifth chapter, which provides a very brief overview of the family classification, and the place of the Australian taxa therein. A figure depicts an evolutionary tree of the palm family, albeit in an ugly pixelated font, and provides a useful phylogenetic context for consideration of the diversity of Australia's indigenous palm flora. A very useful table provides a summary of the morphological features that are characteristic for subfamilies in Arecaceae, although 'spicate' is misspelt as 'spikate' in the Inflorescence section. Additionally a dichotomous key to subfamilies is provided at the end of the chapter, although this seems largely redundant given the excellent table preceding it. The concluding paragraph attempts to clarify usage of the family names, Arecaceae and Palmae, but goes awry. It incorrectly states that Arecaceae is an alternative name to Palmae, whereas Arecaceae is actually the correct name, and Palmae the alternative. Thankfully it does end by denoting Arecaceae as the preferred name in Australia, although it is regrettable that this section has muddled the water, rather than providing definitive clarification.

Chapters 6 to 10 each provide comprehensive treatment of one of the five subfamilies of Arecaceae. Each of these chapters commences with a description of the relevant subfamily, followed by about a page on classification and relationships of the subfamily. Treatments of genera follow, with a detailed morphological description and synonymy spanning about a page in length. Apart from the monospecific cases, generic descriptions are followed by dichotomous keys to species. These keys appear to be clear and work quite well in the couple of cases I tried. The species are numbered in the key according to their order in the following treatment, but since the species are alphabetically ordered the numbering is redundant, and it adds clutter rather than clarity. Indeed, it is surprising given the emphasis of the book on taxonomy and systematics, and inclusion of the latter in the book's title that no effort has been made to arrange species within genera on a phylogenetic basis. Perhaps this is indicative of our lack of knowledge at this level, and is consistent with the author's recent revision of *Livistona* (Dowe 2009), in which species were informally arranged into morphologically similar

groups rather than on the basis of phylogenetic relationships.

The treatment of each species is extremely detailed and this is one of the main strengths of this book, providing detailed morphological descriptions of far greater length than would be possible in a typical flora treatment. The treatments of species consist of synonymy, description, common name, distribution and ecology (including conservation status), etymology, and notes, which provide assorted facts on history of discovery, naming, distinguishing features compared to similar species, and other information such as ecological observations. These treatments range in length from one to two pages of text and provide an unparalleled source of authoritative information on these aspects of Australia's indigenous palm flora.

The text is superbly complemented by a series of colour photographs for every species. A habitat photograph depicts the species in its natural environment and these are mostly clear, of high quality, and often strikingly beautiful. A few of the forest habitat photographs lose detail when reproduced at this size, but they are thankfully in the minority. Each species is also illustrated by a panel of 3–5 (typically 4) photographs that provide detail of diagnostic characters for each species, e.g. crown, leaves, petiole, inflorescence, flowers and fruits. Colour reproduction in the photographs appears to be accurate, with pictures of mature fruits being particularly eye-catching. However, there are cases where no attention has been paid to which photographs may provide the most help for a user of the book, e.g. *Livistona mariae* is keyed out entirely using leaf characters, and yet there is no photograph of a leaf for comparison when you want to check your identification! My only other criticism of these figures is the seemingly ad hoc use of scales: the vast majority of photographs have no scale, a few photographs of fruits have a ruler in view, some with units visible, some not, and very few have either a 5 or 10 cent Australian coin in the photograph. Finally a colour photograph is provided of a type specimen. Often these are quite scrappy specimens, even consisting of just a couple of fruits, so although botanists may find them interesting, they are of questionable usefulness for the average reader, and even for a botanist, the label information is usually not legible due to the

size of reproduction. It may have been preferable to eschew the photographs of type specimens for larger reproduction of the other photographs? Alternatively, if this work were to ever appear as an interactive identification product, à la the EUCLID DVD (Centre for Plant Biodiversity Research 2006) and Wattle CD (Maslin, coordinator, 2001), it would provide a perfect opportunity to incorporate larger, and more useful, photographs of type specimens.

A large, clear map of distribution is provided for every species. The legend for each map states, distribution is based on herbarium specimen data. I could not find a clear statement in the book as to when the maps were compiled or using data from which herbaria. The Acknowledgements section notes access to herbarium data was provided by Brisbane, Melbourne, Cairns, Townsville, Florida and Kew herbaria. If this is representative of the true data sources then it is troubling that half of the major Australian herbaria have not been consulted. A comparison of the maps in the book with those available on-line from Australia's Virtual Herbarium (AVH, <http://www.rbg.vic.gov.au/avh>), for species of *Calamus* revealed several discrepancies. In all cases the AVH maps had a wider distribution, and in most cases outliers hundreds of kilometres away. It is quite likely that some of these AVH records may be erroneous, but the AVH records also provide more continuity between disjunct distributions present in this book's maps, which would seem to suggest the book's maps are based on an incomplete sampling of available data. The 'missing' locality records found on the AVH were predominantly from the Sydney, Canberra and Adelaide herbaria, none of which were acknowledged for provision of herbarium data. It is unfortunate that the admirably clear presentation of the maps has been undermined by a seemingly incomplete assessment of all available data.

At first glance the layout is clear and has wonderful large photos. This holds especially true in the genera with only one or two species, because the figures remain adjacent to the relevant text, but in the more speciose genera, such as *Calamus*, with eight species, the text becomes badly disjointed from the figures. For example, the taxonomic treatment of *Calamus moti* starts at the bottom of p. 64, continues on the lower

1/3 of p. 65 (upper 2/3 with habitat photographs of *C. caryotoides*), lower 1/4 of p. 66 (upper 3/4 with detail photographs of *C. caryotoides*), lower 1/2 of p. 67 (upper 1/2 with map and type specimen of *C. caryotoides*), and finishing the treatment of *C. moti* with a sentence on p. 68, the rest of which has the habitat photograph of *C. moti* and commencement of the textual treatment of *C. muelleri*. Detail photographs, map and type specimen of *C. moti* are on pp. 69 and 70, accompanying the rest of the text for *C. muelleri*, and the start of the treatment of *C. radicalis*. If this sounds confusing, it's because it is! It is very frustrating for the reader to be forced to continually flip backwards and forwards through pages to compare figures and text of a species. It seems that unfortunately the effort to incorporate many large attractive photographs has resulted in a great reduction in usability.

Linospadix is a generic name that has been variously treated as either masculine or feminine (Dowe & Ferrero 2001). If treated as feminine some specific epithets end in 'a', e.g. *L. monostachya*, or if treated as masculine, these end in 'os' or 'us', e.g. *L. monostachyos*. In previous treatments by the author (Dowe & Irvine 1997; Dowe & Ferrero 2001) the feminine gender was adopted for this genus, in keeping with general usage at the time and indeed the author felt so strongly about the issue that, 'A proposal to conserve *Linospadix*, [...] as having a feminine gender, has been accepted for publication in *Taxon* (Dowe & Henderson, in press)' (Dowe & Ferrero 2001). Despite extensive literature searches I could find no record of this 'in press' proposal having been published. It is puzzling that in this book the author has changed his mind and adopted the masculine gender for the genus, without any discussion or justification whatsoever. This is particularly confusing for potential readers since feminine usage is still prevalent in state floras and censuses. It is disappointing that this book reignites confusion on this issue, rather than authoritatively providing clarity.

Doubtful and excluded names are the subject of the eleventh chapter. Interestingly this includes three 'non-Australian' species that are naturalised, i.e. *Phoenix canariensis*, *P. dactylifera* and *Syagrus romanzoffianum*. There is no context given for why these species are suddenly included here, despite the complete absence of non-Australian species throughout the rest of the book.

This becomes more peculiar given that more than half of the species naturalised in Australia are not included in this section, e.g. *Caryota mitis*, *Chamaerops humilis*, *Sabal palmetto* and *Washingtonia filifera* (<http://www.chah.gov.au/chah/apc/interim/Arecaceae.pdf>). All of these species should have been included in the main part of the book, fully described, illustrated and included in the keys, which would facilitate their identification, and recording of their distribution and spread.

Chapter 12 consists of a dichotomous key enabling identification of all species of indigenous palms in the field. The key seems to be clear and works relatively well, but, as pointed out by the author, due to limited vegetative variation amongst some species, it does resort to using floral and fruit characters in some parts, which will quite often limit its usefulness in the field. The limitation of vegetative characters is understandable; I find it more disappointing that introduced taxa are not included in the key. The book includes excellent information on the conservation status of indigenous species, but surely also providing the means to identify naturalised or incipiently naturalised species is critical to conservation efforts and protection of our environment? Species in the key are unnumbered and there is no page reference given, so after keying out to a species, the user must consult the index to locate the species treatment.

A glossary of terms is provided, but it doesn't appear to be particularly accessible due to having no illustrations at all. This is one of the only palm books I have ever seen that does not have explanatory diagrams of basic features such as leaves, leaflets, inflorescence types etc. This is a major deficiency of the book that will seriously compromise its accessibility for the non-specialist, and all the more puzzling since the author provided excellent explanatory diagrams and descriptions in his recent taxonomic account of *Livistona* (Dowe 2009). The old saying, 'a picture is worth a thousand words', rings true when confronted, for example, with the definition of 'hastula' – 'a flap of tissue borne at the insertion of the lamina on the petiole of a palmate leaf'. This definition contains three terms that are defined elsewhere in the glossary, lamina, petiole and palmate. I'd contend that if the reader has a level of understanding that such terms need to be defined, they will have great difficulty visualising

what a hastula is from this definition. Instead, clear line diagrams could have easily and unambiguously illustrated this and other features. Lenticellular, floccose and pruinose are missing from the glossary, and a definition is also missing for 'pistil', even though the definition of 'pistillate' is, 'bearing a pistil', and pistil is also referred to in definitions for stigma, style and unisexual. The definition for 'stamen' incorrectly gives a definition for a filament. Abbreviations, asl, bp, dbh and Mya are frequently used, but I did not come across definitions in the text or glossary.

Finally, the index appears to provide a comprehensive listing of all occurrences of each particular entry in the book. However, that does create a problem – entries will often refer to several pages, in some cases up to 13, so the reader is forced to guess which page will have the commencement of a species' treatment. This is extremely frustrating, and could have been easily avoided by using bold text for the listing of the first page of the relevant treatment of a species.

Australian Palms certainly represents a magnificent achievement by the author and publisher. The introductory reviews, detailed descriptions, associated information, and high quality and abundant photographs, together provide the most complete and authoritative guide available for our indigenous palm flora. It is a shame then that issues such as poor layout, lack of explanatory diagrams, deficiencies in the glossary, maps and index all combine to make using this book a frustrating experience rather than a rewarding one. Also, the decision to restrict the scope of the species coverage to palms indigenous to Australia, rather than the species that grow here compromises and restricts the usefulness of this book. Purely on the basis of content, this book would be highly recommended, and indeed it will be the essential reference for botanists that need a reference to our palms, but given its shortcomings and price, it may end up reaching a smaller audience than such a work deserves.

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